PacComm

PacComm's Goodie Book

the
most powerful
most modern
most fun
smallest
cutest
and GPS friendly
packet radio and pactor equipment

PacComm Packet Radio Systems, Inc.
4413 N. Hesperides Street
Tampa, FL 33614-7618
(813) 874-2980
Fax: (813) 872-8696
BBS: (813) 874-3078 (V.34)
Internet: info@paccomm.com
Orders: (800) 486-7388 (24 hour voicemail)

The NEW PicoPacket

PicoPacket Standard Model and PL-259 for size comparison

PicoPacket Models and Prices

Some models and options are scheduled for later introduction. Call for availability.

- PicoPacket w/32k RAM - $129
- PicoPacket w/128k RAM - $149
- PicoPacket with 2nd serial port, 128k RAM, Real Time Clock - $189
- PicoPacket Batterypack model with 32k RAM - $179
- PicoPacket Batterypack model with 128k RAM - $199
- PicoPacket Batterypack model with second serial port, 128k, RTC - $239
- PicoPacket/GPS. Same as model directly above plus internal GPS receiver and GPS antenna - $599
- Companion GPS receiver w/active antenna, data cable - $399
- Extra battery pack - $45

The PicoPacket is the most convenient and easy to use TNC !

New to packet? Or are you an old timer who has forgotten all the commands? Use the **On-Line Help.**

Just type Help followed by a command name (or part of a command name) and receive the correct spelling, shortest abbreviation, default value(s), acceptable values, and a short explanation of its function.

Inexpensive too!

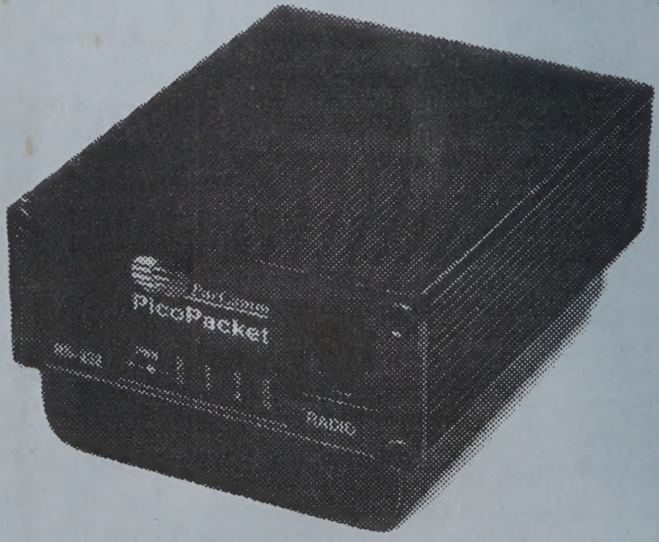
The PicoPacket is the most compact and powerful GPS communication engine on the market.

A. Select the PicoPacket Battery pack model with the internal GPS receiver. Completely self contained in a package under 2.5 x 2.5 x 3.25 inches. Just connect to a handheld radio and you have a complete tracking unit with a full-time serial port to connect to your notebook PC. The mag-mount GPS antenna has about the same footprint as a soda can yet it tracks GPS satellites noticeably better than handheld GPS units.

B. Select the PicoPacket Battery pack model with the second serial port option. It is the ideal TNC for use with a handheld GPS receiver, handheld radio, and laptop (or smaller) computer for APRS activity. One serial port for the computer, a second one for the GPS. No adapter cable needed. Each unit has its own power. Neat and convenient.

What makes the PicoPacket unique?

- It's the only amateur TNC made with modern construction technology: extensive surface mount devices, modular connectors.
- It's the only amateur TNC which has a second serial port for full-time GPS support at the same time as full time computer support.
- It's the only amateur TNC as small as the new GPS receiver boards.
- The PicoPacket with 1 megabyte RAM is scheduled to be the next SAREX TNC.



PicoPacket with Optional Battery Pack

PicoPacket Features

- **Compact!** Standard model only 1" x 2.5" x 3". An inch shorter than a pack of cigarettes.
- **Powerful!** Z-181 high integration MPU with one megabyte address space. A powerhouse.
- **Inexpensive!** Only US **$129** (Standard model, 32k RAM).
- **On-Line HELP** makes this the perfect beginners' TNC. So easy to learn!
- **Terminal programs** for both DOS and Windows™ included.
- **GPS ready.** Firmware has numerous features making attachment to a GPS receiver quick and easy.
- Full support for **APRS** (the Automatic Position Reporting System) built-in. Works with APRS through either the standard single serial port or the optional second serial port.
- **Personal Message System** with all the state-of-the-art features. Over 100k of message storage area in the 128k model.
- **Upgradeable** . EPROM and RAM are socketed for ease in upgrading firmware and increasing memory.
- **Cables Included**. Instruction manual, schematic, Quick Command listing, power cord, 2 radio cables , serial cable and DE-9S adapter included.

  RJ-45 radio cables are made of "real" copper wire - solders easily to radio connectors.
- **Optional RAM**. 128k, or 512k. 1M on special order.
- **Full-time GPS port option**. A second RS-232 serial port for the PicoPacket allows both a GPS and computer to be attached to the PicoPacket at the same time. Eliminates the need for a hardware port switch adapter. The GPS port option also provides a real-time clock and 128k RAM.
- **Companion GPS receiver**. A Trimble SVeeSix-CM3 receiver fits in a separate case the same size as the Pico and attaches via an audio stereo cable.

  Operates from 12 VDC with internal regulation for GPS protection. Mag-mount active GPS antenna provided.
- **Internal GPS Receiver** . A GPS receiver is fitted directly into the PicoPacket. Includes the second serial port option. Total size only 2.4 x 2.5 x 3.25 inches.

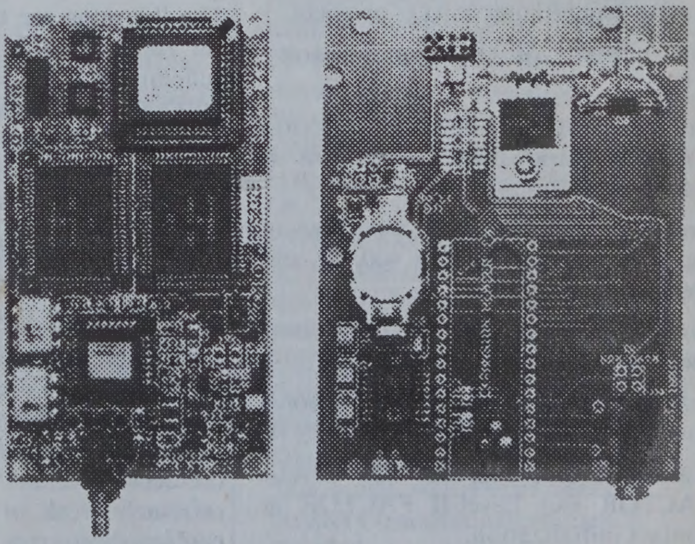
  The GPS model has a built-in Trimble SVeeSix-CM3 GPS receiver. Mag-mount active GPS antenna provided.
- **Battery Pack** model. The case of the battery pack model fits a quick-change 6VDC slide-on/slide-off battery pack which allows continuous operation. The PicoPacket contains a built-in battery charging circuit.

Size Comparison - PicoPacket & ICOM IC-02AT

GPS Support

The PicoPacket companion GPS and PicoPacket with internal GPS both use a support/carrier board (shown below) to perform the following functions.

- Physical support for the GPS receiver in the case.
- Voltage regulation.
- Backup battery for GPS.
- TTL to RS-232 conversion.



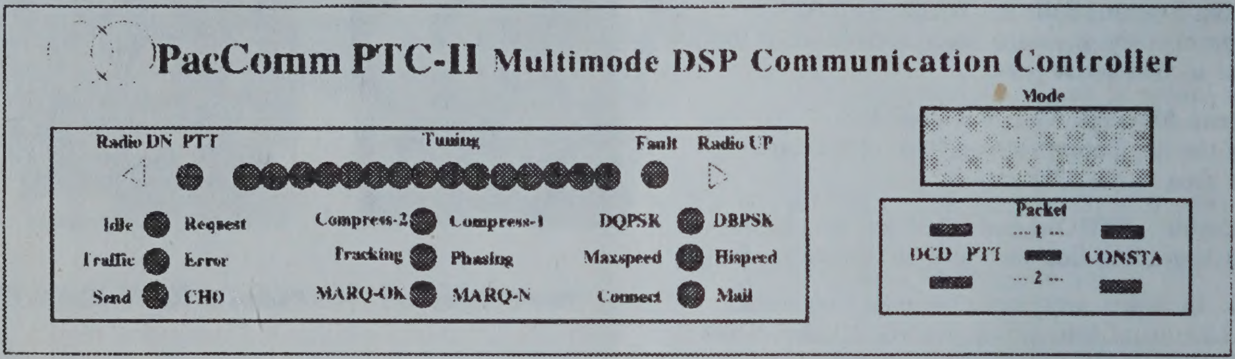
Trimble SVeeSix-CM3 OEM GPS Rcvr & PicoPacket support board

PacComm PTC-II Multimode DSP Communication Controller

The PTC-II is a new multi-mode controller and "communications platform" which contains very powerful and flexible hardware and firmware.

It is being built in the United States by PacComm under license from S.C.S., the developers of both PACTOR-I and PACTOR-II.

The PTC-II offers the most robust HF digital protocol available to radio amateurs, but it should not be overlooked that it is configurable as a triple-port multimode controller supporting packet rates of 1200 and 9600 baud.



Drawing of PacComm PTC-II Front Panel

Why PACTOR-II?

DSP technology has reached a stage allowing the implementation of high performance modems with reasonable price- to-performance ratio .

All advantages of the original PACTOR protocol are retained.

A step-synchronous ARQ- protocol.

Full support of analogue memory-ARQ.

Independent of sideband selection with no Mark/Space convention or similar limitations.

Free choice for the center frequency of the audio signal between 400 Hz and 2600 Hz.

Long-path option with ARQ links over long-path possible.

Full compatibility with "older" protocols.

Automatic switching between Level-I PACTOR and Level-II PACTOR at contact initialization.

A bandwidth of less than 500 Hz at -50 dB, so that operation within 500 Hz channels is possible and use existing 500Hz CW filters.

Constant bandwidth irrespective of the actual effective transmission speed.

The Modulation System

Differential Phase Shift Keying is the modulation system used for PT-II which leads to a very narrow signal practically independent of the data rate.

PT-II uses two tones (or carriers) sent together as continuous tones. The form of the spectrum is equal to the squared Cosine function. The complete signal then has a spectrum 450 Hz wide at minus 50 dB. PT-II utilizes a symbol speed of 100/sec. The reason why Differential PSK is used on HF links is that signals are much too unstable and noisy (or with too large a frequency error) to be used effectively by "normal" coherent PSK detectors.

The following are the total data transfer rates for the PT-II modulation scheme (without data compression).
DBPSK = 200 Bits/sec.
DQPSK = 400 Bits/sec.
8-DPSK = 600 Bits/sec.
16-DPSK = 800 Bits/sec.

The PT-II signal must always use SSB to generate the HF signal.

Error Control Coding

PT-II uses high performance convolutional coding that is complemented by a real Viterbi decoder in the data receiver. The high correction capacity of the decoder allows not only a link with extremely weak or noisy signals, and enables short error bursts or fade-outs to be entirely ignored.

The basic idea behind error correcting codes is that extra information is transmitted along with the required data so that the "redundancy" of the signal is increased. The two principal codes are Block codes and Convolutional codes.

Block codes were the first to be developed due to their simplicity. Unfortunately, they have all proved to be rather weak, as only a very few bits per block can be corrected. For example, the (24,12)-Golay-code can only correct a maximum of 3 bits in a block of 24, even though there is a redundancy of 12 bits contained in each block.

In Convolutional coding a message (or a data packet) is coded as a complete entity. The actual encoder consists of a tapped shift register and carries out an algorithm which strongly resembles the mathematical convolution integral. The length of the shift register is called the Constraint Length and sets a limit to the correction capacity that can be achieved. The present day generation of DSPs allow use to Constraint Length 9 or in special cases even more.

Another aspect of coding is so-called Interleaving. This is nothing more than a shuffling of the order of the data. If an error burst takes place this is cut into relatively widely spaced single bit errors by the interleaving and de-interleaving process. These bit errors resemble noise during the decoding, which the decoder is designed to handle well.

PACTOR-II is based on a Convolutional code with a constant length of 9 and a Viterbi decoder with Soft Decision coding. The coding rate varies between 1/2 and 7/8.

On-line Data-Compression

Markov coding is like a "doubled" Huffman compression. Not just the simple frequency distribution of characters is important but the frequency distribution of the initial two-byte sequence is. The resultant frequency distribution is much sharper than the simple frequency distribution of the characters in text and therefore allows better compression. The Markov compression is limited to the 16 most common 'leading' characters. All other characters result in normal Huffman compression. This hybrid of Markov and Huffman coding is called pseudo-Markov coding.

The PTC-II examines each packet individually to see if it would be faster to send it using Huffman, PMC or normal ASCII transmission. PT-II uses Run-Length coding so that sequences of repeated characters (e.g. underlining or columns in graphics) can be transmitted very efficiently

PACTOR-II in Practice

Experienced users of PACTOR-I should have no trouble changing to PACTOR-II, particularly if they know the command set of the PacComm PacTOR controller.

It is essential that the AF output level and the maximum output power in FSK and DPSK modes are correctly set.

CQ Calls and Broadcasts

As with PACTOR-I, a CQ call or broadcast is normally carried out with 100 Bd. FSK Unproto mode. Such transmissions can be read by all PACTOR users.

At the very start of a link, the two controllers automatically agree to use the highest common level.

The DPSK-Demodulator can only operate correctly when it knows the receive frequency accurately to within a few Hertz. The highly robust automatic frequency compension built into the PTC-II needs a few seconds to be sure that a sudden frequency change has occurred.

With very weak or noisy signals the PTC-II adjusts its tuning very slowly to minimize tuning error. NEVER tune the VFO by hand with very weak or inaudible signals!

Performance

With good to very good propagation conditions, PT-II has shown itself to be 4 to 6 times faster than PACTOR-I, and about 3 times faster in average to poor conditions.

PTC-II Hardware

The PTC-II is a sophisticated unit. It uses the Motorola 68360 MPU which has a capacity of 4.5 MIPS (million instructions per second). The PTC-II HF modem is a Motorola 56156 DSP with a capacity of 30 MIPS.

Flash ROM is used to store the firmware. Updates may be read into the serial port with the provided terminal program.

An optional SIMM of up to 16 megabytes may be added to vastly increase the message system storage capacity.

The PacComm version features a PacComm designed front panel display with improved layout and readability. The PacComm PTC-II also features a watchdog timer on the HF PTT line and fault LED which indicates if there is a keying problem.

Tuning Indicator and Behavior

The tuning indicator consists of 15 dual color LEDs and in Level-II operation not only show the quality of the received signal, but also its frequency offset. With an error free received DPSK- signal only the two outer LEDs should flicker. When the tuning is exactly correct the center LED is lit.

Operational Display and Status LEDs

The PTC-II shows the operational mode on a 10 character LED display. The nine status LEDs have a number of new functions:

Compress2/Compress1: Displays which compression method is being used. Compress 1 is Huffman-coding, Compress 2 is pseudo-Markov coding. If the LED extinguishes the packet is an ASCII packet.

Tracking/Phasing: Tracking lights for a short time when the PTC-II changes the carrier frequency during a PT-II link. Phasing is active if a new attempt at phasing takes place in AMTOR (ARQ and FEC).

MARQ-OK/MARQ-IN: MARQ-OK lights if the actual packet has been correctly reconstructed using Memory-ARQ. MARQ-IN shows that the present packet is being reconstructed and is not classed as a Request packet.

DQPSK/DBPSK: These indicate if the packet is a DQPSK or DBPSK one. This also functions in the listen mode.

MaxSpeed/HiSpeed: MaxSpeed lights during 16-DPSK packets (also with Unproto and Listen-Modes). HiSpeed lights during PT-1 packets which are 200-Bd. (also with Unproto and Listen), and when PT-II packets using 8-DPSK are being used.

Connected/Mail: The Connect LED lights continuously in the connected condition (AMTOR, PACTOR). In the STBY condition, Mail blinks once per second if there is unread personal mail.

Price and Availability

The PacComm PTC-II will be available in limited quantities beginning in June. Expect delivery delays of 30 to 50 days due to the scarcity of some components.

Priced at $995. Packet modems are optional extras. Call for details.

The PacComm PacTOR Controller - PACTOR-I

Not ready for the PTC-II? Consider the original PacTOR unit from PacComm. Still an ideal and affordable way to communicate digitally over HF

- PACTOR, AMTOR, and RTTY modes, Packet option.
- Error-free data transmission including binary files.
- Up to four times faster than AMTOR.
- Complete ASCII character set, 8 bit data.
- Memory-ARQ with analog to digital converter restores bad data packets.
- On-line data compression.
- Automatic speed adaptation 100 or 200 baud data rates.
- UNPROTO mode (FEC).
- Listen mode to monitor PACTOR QSOs.
- CW Identification capability.
- Built in Message System.
- Automatic logbook function which is accessable over the air and locally.
- LED digital tuning display.
- 16 status LEDs.
- Watchdog timer on PTT line.
- Selectable for either 'High Tones' or 'Low Tones' with proper filters.
- MeisterTerm terminal program included.
- VHF packet card may easily be added internally at low cost.
- Only $285

The SPIRIT-2 High Performance Packet Controller

The PacComm SPIRIT-2 Packet Controller

PacComm announces the SPIRIT-2 High Performance Packet Controller, a new third-generation packet controller designed for the second decade of packet.

The SPIRIT-2 is the ideal TNC for the modern (9600 bps & faster) packet station & for BBS, satellite and NODE use.

The SPIRIT-2 is built for reliable high performance, yet is very affordable.

Uses reliable, tested technology (G3RUH modem, TNC-2 CPU architecture) with large-scale programmable logic circuits to reduce cost for solid, reliable performance.

Firmware Features

PacComm firmware uses TAPR style commands with many PacComm extensions and improvements, including KISS (see PacComm firmware page for more details).

- Special command set to support Global Positioning System (GPS) receivers. APRS compatible.
- Special commands support Deviation meter and Signal Strength accessory board (see AD4 page).
- Personal Message System features forwarding, reverse forwarding to other PMS & to BBS. Forwards via network connections or directly. Many powerful features.

Digital Section Features

- 512kbit (64k Byte) EPROM.
- 128k RAM provides 64k of Personal Message System storage and large send and receive buffers.
- TNC-2 compatible design works with any TNC-2 EPROM.
- Bank-switching circuit for TheNet. Ready to run TheNet X1J or later EPROM.
  - » No wiring modifications required, just set jumpers.
- 9.8 MHz CPU clock speed and 10 MHz rated parts are standard. 20 MHz CPU option.
- Terminal baud rates from 9.6 kb up to 57.6 kb for satellite file downloads without dropped frames.

Modem Features

- G3RUH design modem with PLL demodulation for outstanding performance.
- Two independent modem transmit and receive filter sections to allow jumper selection of two radio baud rates with optimum transmit and receive filtering for each.
- Radio baud rates from 4.8 kb up to 57.6 kb are supported for fast satellites and network node use.

User Features

- Six LEDs. Power (red), Connect (green), Status (yellow). Push to Talk (red), DCD (green) and OPT (a multi-purpose dual color LED).
  - » When used with the CoaxLAN, red and green indicate transmit and receive data on the LAN.
- Black anodized aluminum case; rugged, attractive, and RFI/EMI resistant.
- Extensive RFI/EMI filtering. This is a quiet TNC!

Reliability Features

- Radio and serial port lines extensively filtered against RF and noise effects.
- Major RS-232 and radio lines and power feed are protected against power spikes with on-board surge surpressors (Transorbs).

Network Features

- TNC-2 EPROM compatible. TheNET X1, ROSE, and TEXNET ready. Processing power and modem performance for serious throughput.
- PacComm's CoaxLAN circuit is built in for easily interconnecting multiple SPIRIT-2s for node stacks. Works with NET/ROM, TheNET, and ROSE. No more need for diode matrices!
  - » Interconnect the SPIRIT-2 to TINY-2 and MFJ node units by adding CoaxLAN adapters to those TNCs' TTL ports.

Standard and Optional Accessories

The SPIRIT-2 is delivered with:

- Operating Manual with 'Quick-Start section' (Standard and Satellite models only).
- Hardware Manual with all schematics
- Computer cable to fit 9 pin PC serial port.
- Unterminated radio cable.
- Power supply (120vac to 12vdc) and cable.
- Accessory socket cable plug.

SPIRIT Models

The SPIRIT-2 is offered in four con-

PacComm Amateur Products Price List (as of June 1, 1995)

Packet and PacTOR Controllers

PicoPacket Standard model, 32k RAM	$ 129
Standard model, 128k RAM	$ 149
Standard model, 2nd Serial Port, RTC, 128k RAM	$ 189
PicoPacket withBattery Pack, 32k RAM	$ 189
PicoPacket w/Battery Pack and 128k RAM	$ 209
PicoPacket w/Battery Pk, 2nd Serial Port, RTC, 128k	$ 249
Spare battery pack for PicoPacket	$ 45
PicoPacket with Battery Pack and Internal GPS	$ 629
Companion GPS in case to use with PicoPacket	$ 399
SPIRIT-2 Standard model	$ 239
Power supply (US only), Operating and Technical manuals, schematic, cables. 9600 modem filter included.	
SPIRIT-2 Satellite Model	$ 249
Power supply (US only), Operating and Technical manuals, schematic, cables. 9600 and 38400 modem filters included.	
SPIRIT-2 Node and Backbone models - see Network Products	
TINY-2 MK-2	$ 149
Operating and Technical manuals, schematic, TNC connectors	
10 MHz option, factory installed	add $ 25
'Open Squelch DCD' option	add $ 25
Internal DFM 9600 bps modem card (MC-NB96)	$ 119
TINY-2 MK-2/GPS	$ 629
Power Supply (US only), TNC manuals, schematics, cables	
TINY-2 /10 MHz with internal GPS and antenna	
'Open Squelch DCD' option	add $ 25
GPS Manual	$ 40
TNC-NB96 Switchable 1200/9600 TNC	$ 289
Power supply (US only), Operating and Technical manuals, schematics, cables	
PacTOR Controller (PACTOR, AMTOR, RTTY)	$ 279
Power supply (US only), Operating manual, schematics, cables	
Packet Adapter	$ 99
'Open Squelch" DCD on Packet Adapter	add $ 25
PacTOR-II MultiMode DSP Controller	$ 995
Callfor information about packet modem options	
HandiPacket with all accessories	$ 229
Power supply (US only), Operating and Technical manuals, schematics, cables, belt clip, Velcro ™ straps	
Extra unterminated radio cables - See Cable Section	
PSK-1 Packet Satellite Modem	$ 239
Power supply (US only), Operating manual, schematics, serial, radio, and telemetry cables	
IPR-NB96 Integrated Packet Radio	$ 499
Power supply (US only), Operating and Technical manuals, schematics, cables	
Specify exact frequency between 430 and 450 MHz.	
TNC-320 HF/VHF Packet Controller	$ 219
Operating and Technical manuals, schematics, TNC connectors	
'Open Squelch DCD' option	add $ 25
Hardware Real-time clock option	add $ 30
PC-320 HF/VHF Internal PC Controller	$ 209
Operating and Technical manuals, schematics, TNC connectors	
'Open Squelch DCD' option	add $ 25
Dual radio cable (6 ft pigtails for radios)	$ 13
Hardware Real-time clock option	add $ 30
Gracilis PackeTwin mfg. by PacComm	$ 249
Dual port HDLC card with DMA, TTL, RS-232 or RS-423	
Shipped with NOS drivers for low cost TCP/IP system	
Surface mount DFM modem - specify speed - 4800 to 64kb (also fits Kantronics DataEngine)	$ 149
PC-120-1 Single port packet adapter for PacketCluster	$ 99
Installation & operating instructions, schematic, cable connector	
PC-120-2 Dual port packet adapter for PacketCluster	$ 149
Installation & operating instructions, schematic, cable connector	
TNC-200 Bare board, EPROMs, Manual	$ 40
Cabinet (case, bezels, end plates, etc.)	$ 30
BayMod-9 1200 bps modem w/BayCom Software	$ 65
Manual and diskette. Specify 3.5" or 5.25" disk	
BayMod-25 1200 bps modem w/BayCom Software	$ 65
Manual and diskette. Specify 3.5" or 5.25" disk	
BayMod-9600 9600 bps modem w/BayCom Software	$ 119
Operates from PC parallel port. Manual and diskette. Specify 3.5" or 5.25" disk	
BayMod-9600 without software	$ 99

Node Models & Network Products

SPRINT-2/Node	$ 239
Technical manual, schematic, cables, TNC connectors	
SPIRIT-2/Node/20 MHz	$ 279
Technical manual, schematic, cables, TNC connectors 9600 Bd primary filters, customer selection of secondary filters	
SPIRIT-2/Backbone	$ 279
Technical manual, schematic, cables, TNC connectors	
IPR-NB96/Node	$ 479
Technical manual, schematics, TNC connectors	
TINY-2 / Node *without* EPROM	$ 129
Technical manual, schematics, TNC connectors	
'Open Squelch DCD' option	add $ 25
TINY-2/Node /10MHz	$ 149
Technical manual, schematic, TNC connectors	
'Open Squelch DCD' option	add $ 25
TINY-2/9600/Node *without* EPROM	$ 239
Technical manual, schematics, TNC connectors	
TINY-2/9600/Node/10MHz	$ 259
Technical manual, schematics, TNC connectors	
Gracilis PackeTen mfg. by PacComm	$1595
Powerful NOS-AX.25-NET/ROM network switch. Up to 5 ports	
Surface mount DFM modem - specify speed - 4.8 to 64kb (also fits Kantronics DataEngine)	$ 149
EZ-MATRIX	$ 35
Complete diode matrix kit	
Radio Multiplier-II	$ 149
Schematic, instructions	
CoaxLAN Adapter, For use with TINY-2 or MFJ TTL port	$ 25
Assembled. Schematic. Quantity pricing available. Must specify ROSE or TheNet model	
MC-NB96 Internal 9600 bps upgrade modem for TINY-2, TNC-200, MFJ, etc.	$ 119

Radios and Filters

TEKK KS-900 70 cm data transceiver (factory version)	$ 179
TEKK KS-960 70 cm data transceiver (factory version)	$ 199
TEKK KS-900L-D96 (9600) Modified with Digital 'D' and Monolithic 21.4 filters	$ 230
TEKK KS-900L-D192 (19200) Modified with Digital 'C' and Monolithic 21.4 filters	$ 235
TEKK KS-960L-D96 (9600) Modified with Digital 'D' and Monolithic 21.4 filters	$ 250
TEKK KS-960L-D192 (19200) Modified with Digital 'C' and Monolithic 21.4 filters	$ 255
Digital 'C' filters for 19.2 kb (each) Part # SFH455C	$ 19
Digital 'D' filters for 9.6 kb (each) Part # SFH455D	$ 15
Monolithic 21.4 MHz filters (pair) Part # MCF21.4F30B	$ 20
9600 filter kit (one D and two 21.4 monolithic filters)	$ 35
19200 filter kit (one C and two 21.4 monolithic filters)	$ 39

Accessories and Upgrades

PacketPet for Windows Delivered on two 3.5 inch HD diskettes, plus manual Must supply callsign to be used for password generation	$ 79
BayCom Version 1.60 Software (without modem) Software diskette and manual. Specify 3.5" or 5.25" disk	$ 25
MC-NB96 Internal DFM modem card to upgrade TINY-2, TNC-200, MFJ, etc. to 9600 bps operation Technical manual, schematic, connectors	$ 119
AD-4 with S Meter Function Specify if Header model (SPRINT-2) or 40 pin CPU plug-in model	$ 49
'Open Squelch DCD' adapters (specify model) DCD-3105 model (TINY-2/MICROPOWER-2) DCD-Header model (TNC/PC-320, TNC-200, any TNC with TAPR modem disconnect header) DCD-Universal model (has wire leads for connection)	$ 29
10 MHz Upgrade Kit for TINY-2/TNC-200 CPU, SIO, 100 ns EPROM, misc. Please specify model and version number of TNC	$ 25
APRS Port Switch (HSP Mode Switch) Fits PC with DE-9P, and TNC & GPS with DE-9S	$ 29
Audio AGC Kit by K7NM (AGC-4)	$ 29
Heath Pocket Packet (HK-21) EPROM Upgrade Latest PacComm firmware, Installation Instructions. EPROM, Operating Manual, Command Reference Card	$ 50
Latest PacComm EPROM Must furnish TNC model	$ 29
32k RAM (memory) chip for user upgrade	$ 12
128k RAM (memory) chip for user upgrade	$ 25
Manual set (any product except GPS) Operating/Technical Manual(s), schematic(s)	$ 10
TheNet X1J EPROM programmed with your parameters Includes cost of EPROM. Diskette copy of X1J included	$ 25

Cables, Power Supplies

All RS-232 cables are $12 unless otherwise marked.

CBL-232M/M 25 pin male to 25 pin male, 8 conductor for TNC-200, MFJ etc. to dumb terminal with female DB-25.	
CBL-232M/F 25 pin male to 25 pin female, 8 conductor for TNC-200, MFJ to PC/XT male DB-25, or as 'extension cable.'	
CBL-925F/M 9 pin female to 25 pin male for TINY-2/ MICRO-2/ TNC-320 to dumb terminal female DB25.	
CBL-925F/F 9 pin female to 25 pin female TINY-2/MICRO-2/ TNC-320 to PC/XT male DB-25.	
CBL-925M/M 9 pin male to 25 pin male for SPRINT-2 to dumb terminal female DB25.	
CBL-925M/F 9 pin male to 25 pin female for SPRINT-2 to PC/XT male DB-25.	
CBL-99F/F 9 pin female to 9 pin female for TINY-2/ MICRO-2/ TNC-320 to PC/AT or laptop male DE-9.	
CBL-99M/F 9 pin female to 9 pin female for SPRINT-2 to PC/AT or laptop male DE-9 or as 'extension cable.'	
CBL-99M/M 9 pin female to 9 pin female for SPRINT-2to female DE-9.	
CBL-64-320 TNC-320 to C-64/128 with TTL/RS-232 converter	$ 29
CBL-64-TMR TINY-2/MICRO-2 to C-64/128	$ 29
HandiPacket unterminated radio cable (5 ft.) 8 pin MiniDIN connector	$ 6
TNC to radio unterminated cable (5 ft.) Specify 5 pin DIN or 8 pin DIN connector	$ 6
120V to 12VDC wall power cube 0.5 or 0.8 Amp., 2.1 mm coaxial plug, 4-5 ft. cord	$ 12

Prices do not include applicable taxes and shipping charges.

Repair Service

$35/hr plus parts and shipping.

Commercial Service Contracts

Call for information about service contracts and/or extended warranties for amateur products used in commercial service. Amateur units used in commercial service are not subject to any quantity discounts.

SPIRIT Models

The SPIRIT-2 is offered in four configurations: Standard model for ham shack and BBS use, Satellite model, Node model, and a 20 MHz Backbone model.

Standard Model

- 128k RAM.
- PacComm firmware including PMS.
- Main modem filters configured for 9600 bps and auxiliary modem filters unconfigured.

RF Baud Rate vs. Bandwidth in the SPIRIT-2 implementation of the G3RUH Direct FM Modem

4.8 kb	8 kHz
9.6 kb	15 kHz
19.2 kb	30 kHz
38.4 kb	60 kHz
57.6 kb	90 kHz

Satellite Model

- 128k RAM.
- PacComm Firmware.
- Modem configured for 9.6 and 38.4 kbps.

Node Model

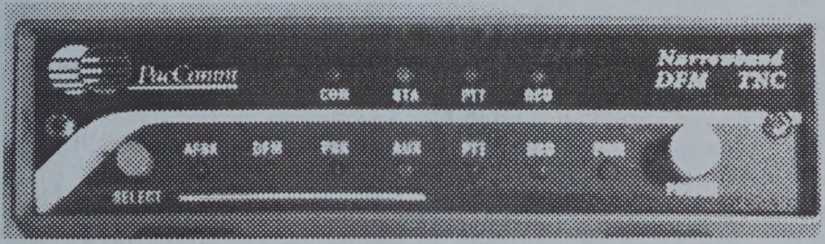
- 32k RAM.
- Blank 27C512 EPROM (factory burned TheNet X1J or ROSE at extra charge - please specify all parameter defaults required).
- Modem configured for 9.6 and 38.4 kbps. Other speeds upon request.

Backbone Model

- 32 k 70 nanosecond RAM.
- Blank 27C512 55 nanosecond EPROM.
- 20 MHz CPU running at 19.6 MHz.
- Modems configured for 38.4 and 57.6 kb.

Standard and Node models: $225.
Satellite model: $236.
Backbone model: $260.

TNC-NB96 1200/9600 Baud Packet Controller



The TNC-NB96 is PacComm's dual speed TNC - it does both 1200 baud AFSK and 9600 baud DFM. The ideal TNC for the modern packet station.

The TNC-NB96 is a TINY-2 MK-2 TNC with open squelch adapter and a G3RUH DFM modem. A front panel push button switch selects between 1200 AFSK, 9600 DFM, 1200 baud PSK (if PSK-1 is attached) and the fourth selection is whatever modem is connected to the rear-panel modem accessory connector. Once you make up and install the cables, only a button push is needed to switch between modes.

PacComm The TNC-NB96 is the perfect companion to the PSK-1 Satellite Modem to allow access to the 1200 bps Microsats and the 9600 bps PacSats through the same multimode transceiver. No cable changing is required with most radios to change between 1200 bps AFSK or 1200 bps PSK terrestrial packet and 9600 bps or 1200 bps AFSK/PSK satellite operation.

Rear panel accessible TAPR modem disconnect header allows all TAPR and PacComm compatible expansion cards to be fitted in moments.

- 32k non-volatile RAM. Provides over 14k message storage. LED Message waiting indicator.
- 64kB EPROM contains two 32kB EPROM images (selectable by rear panel switch). PacComm's latest firmware including PacComm's famous Personal Message System local mailbox and WA8DED host mode.
- Rugged extruded case - 6 x 7 x 1 7/8 inches. Grey epoxy finish. Weight 35 oz. (1kg).
- Serial rates of 300 to 38.4k baud, jumper selected.
- Shipped with all interconnecting cables, power cube, new User's Manual, Command Reference Card, and complete schematic diagrams. $295.

The PacComm TINY-2 MK-2/GPS

Want to experiment with Automatic Position Reporting System (APRS) tracking of your boat or vehicle? The TINY-2 MK-2/GPS integrates a Trimble SVee6-CM3 OEM GPS module inside the TINY-2 case for convenient and troublefree operation.

Firmware Features

Switch from using your TINY-2 as a regular TNC to a remote vehicle tracker by executing one simple command.

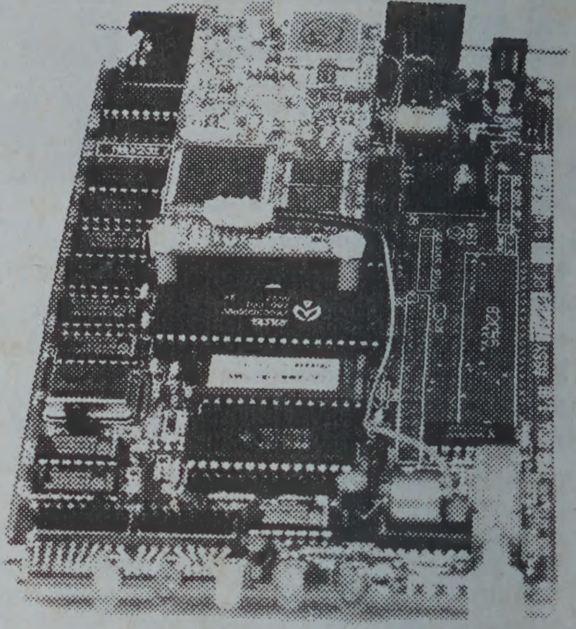
PacComm's latest firmware including PacComm's famous Personal Message System local mailbox.

NMEA command structure compatible. Uses any NMEA GPS output string to place latitude, longitude and satellite availability into CText, LText, SText, etc.

- A dedicated 'beacon function' is available for location information. LOCATION command (like BEACON command), LTEXT (like BTEXT), LPATH (like UNPROTO).
- Select decoding ANY NMEA GPS output string with the GPSTEXT command.
- The GPSITEXT command allows sending a custom configuration string to the GPS at power-up for custom applications. The Trimble GPS supplied with PacComm units has custom firmware to accept this initialization.

Hardware features

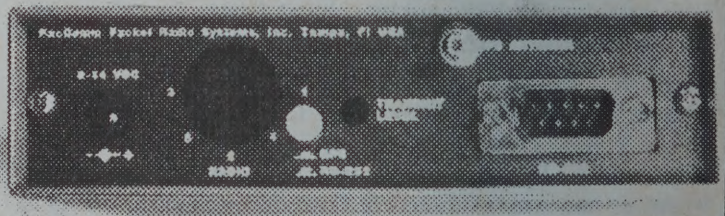
- Low power consumption: TNC, GPS & antenna. 280 mA.
- Optional Open Squelch (Digital DCD) Adapter, Hardware (Real Time) Clock available as options.
- SVee6-CM3 GPS bolts securely to mounting holes on the TINY-2 circuit board (revision 1.8).
- The EPROM switch on the TINY-2 is converted to use as a Terminal/GPS switch. Set the switch one way and you can program the TINY-2 with commands, set the switch the other way and the GPS is connected and automatically updating the TINY-2 buffers.



- A differential GPS version of the Trimble GPS is available at a small additional cost. The unit monitors the packet channel for DGPS updates while also transmitting its own position.
- The TINY-2/GPS is supplied with an active gain antenna (mag-mount) which makes it more sensitive than hand-held units. The antenna has a 15ft lead for convenient placement on any vehicle.

Ordering Information

Order model TINY-2/GPS. Allow two to three weeks for delivery. $595. Price subject to change without notice or obligation. Delivery is from stock to three weeks depending on availablity of GPS receivers.



PacComm Packet Radio Systems, Inc.

4413 N. Hesperides Street,

Tampa, FL 33614-7618 USA

SOUND RADIO PRODUCTS

Seattle: 946 Elliot Ave W 206-286-0606
Everett: 206-334-8577 or 1-800-684-7777
Email: Jay at SoundRadio@aol.com
Ted at TWeiler@eskimo.com